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A. BLOOM ET AL

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FILTER MASK FACELET

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Fig. 1.

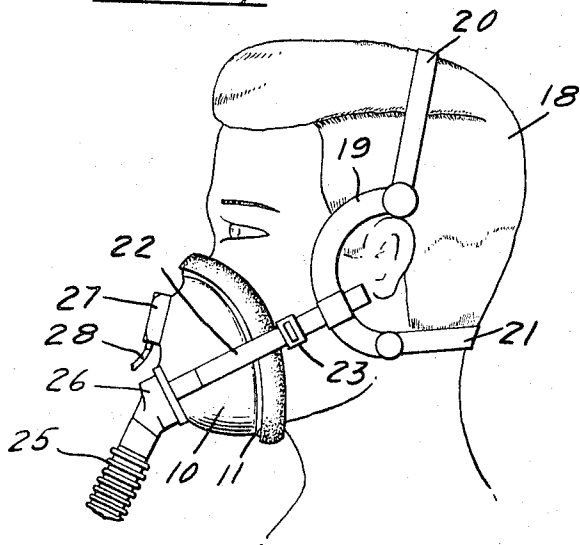


Fig. 4.

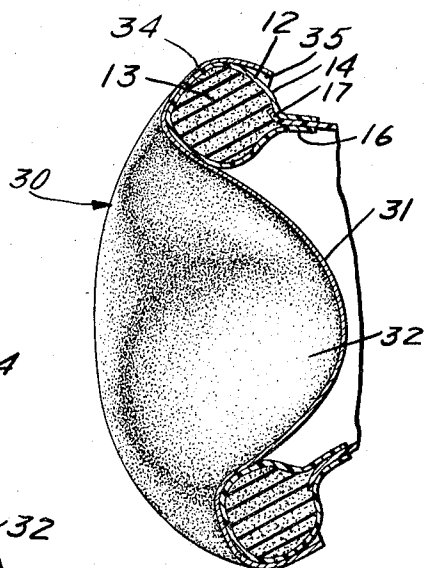
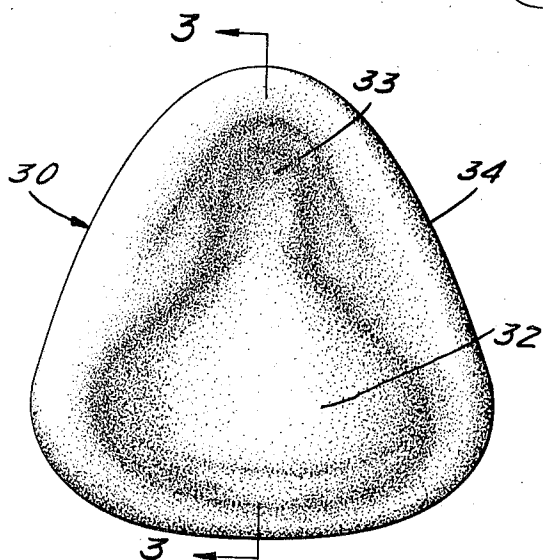
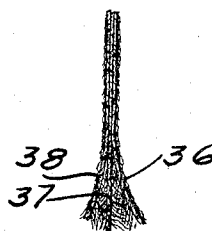


Fig. 3.

Fig. 2.

Inventors,
 Aaron Bloom
 John D. Ott
 by
 Beehler & Arant
 Attorneys

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FILTER MASK FACELET

Aaron Bloom, Pasadena, and John D. Olt, Sierra Madre, Calif., assignors to Sierra Engineering Company, Sierra Madre, Calif., a corporation of California
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 3 Claims. (Cl. 128—146.4)

The invention relates to breathing masks, such for example as those worn by the crewmen of aircraft and is especially related to the provision of sanitary means to avoid contamination of one crewman by the respiratory ailment which another crewman might be afflicted with.

In the handling of high-flying airplanes the cabin and cockpit are customarily pressurized so that the crewmen of the airplane do not habitually wear breathing masks on their faces. As a necessary precaution however, a suitable breathing mask is supplied for each individual crewman, which may either hang on the crewman's neck, or pursuant to more recent regulations may be suspended from the interior of the cockpit so that it can be quickly grabbed and donned should there be a failure of cabin pressure for any reason.

On those occasions particularly where the mask may be suspended in the cockpit there is no reason to change masks everytime the crew changes because with adjustable harness the mask for one crewman may be readily readjusted to fit a succeeding crewman in the change of crew where facial characteristics differ.

It is however, quite usual for crewmen to be afflicted with head colds or other respiratory ailments which is desirable not to pass from one person to another. Since also it is necessary each time a crewman when he takes his position in the cockpit to be certain that the mask at his disposal is carefully adjusted to his face he must don the mask upon arriving in the cockpit and make the adjustment. This of course is the same mask which may previously have been donned and adjusted by the preceding crewman who may have been afflicted with a respiratory ailment.

Since the adjustment must be made while the oxygen supply is open to the mask and the radio equipment is in place, these conditions must be maintained irrespective of what sanitary device is employed to prevent contamination of the succeeding crewmen.

It is therefore among the objects of the invention to provide a new and improved filter mask facelet which is capable of protecting each crewman as he adjusts the mask to fit his face after the mask has previously been used by another.

Another object of the invention is to provide a new and improved filter mask facelet which offers no objectionable resistance to the flow of air into and out of the mask while it is in place and which also will not interfere with operation of the conventional breathing valve or microphone fixture.

Still another object of the invention is to provide a new and improved filter mask facelet and mask combination wherein the facelet is substantially self-sustaining both in place on the mask and prior to placement in the mask so that it clears not only the nose and mouth of the wearer but also the breathing valve and microphone equipment.

Further included among the objects of the invention is to provide a new and improved filter mask facelet which is extremely light in weight, substantially pervious to offer no objectionable obstruction to the flow of air or gas, which can not damage in any way the breathing or microphone equipment in the mask and which is sufficiently inexpensive to be freely disposable after each use.

The objects of the invention also include the provision of a filter mask facelet which is sufficiently firm so as to

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be capable of holding itself in position on the face piece of the mask when not in use without employment of auxiliary holding means.

With these and other objects in view, the invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter set forth, pointed out in the appended claims and illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a side elevational view of a mask assembly including the filter mask facelet in position on a crewman.

FIGURE 2 is a plan view of the filter mask facelet alone looking at the face contacting side thereof.

FIGURE 3 is a fragmentary longitudinal sectional view of the face contacting portion of a typical face piece provided with the filter mask facelet in position, taken for example, at the line 3—3 of FIGURE 2.

FIGURE 4 is a fragmentary cross-sectional view of the facelet material drawn to an enlarged scale.

In an embodiment of the invention which has been chosen for the purpose of illustration there is shown a mask assembly of substantially conventional form incorporating a formed face piece 10 having a rim 11 to which is tied a relatively yieldable sealing bead 12. The rim 11 has a shape and contour approximating the shape and contour of the face around the line of contact of the bead 12 with the face. To make certain of an appropriate seal the bead may be formed with an inside resilient mass 13 of material held in place by a flexible jacket 14. Edges 15 and 16 of the flexible jacket are bound to the rim 11 and an out-turned portion 17 thereof by some appropriate conventional adhesive.

To mount the face piece upon a head 18 of a crewman there may be provided an ear piece 19 having a head strap 20 and a neck strap 21 fastened respectively to the top and bottom of the ear piece. A mask strap 22 including an adjustable buckle 23 is fastened at one end to the ear piece 19 and at the other end to the face piece 10. An oxygen supply hose 25 is connected to a valve housing 26 on the face piece, the valve housing being one containing a conventional breathing valve device. Also mounted upon the face piece is a microphone fixture 27 to which a wire lead 28 is connected so that a microphone (not shown) within the face piece can be connected to the communication system.

A mask facelet is indicated generally by the reference character 30. The mask facelet is constructed of felted fibers which in final form can be molded so as to be capable of retaining a selected shape and configuration such as that shown in FIGURES 2 and 3. The facelet may be described as including a central portion 31 dished so as to provide a chamber 32 large enough to accommodate the forward portion of the face of the crewman. A narrow section 33 of the chamber 32 is sufficient to accommodate the nose whereas the lower portion, being larger, is sufficient to accommodate the mouth. Around the edge of the facelet 30 is a large rounded rim 34 which has substantially a shape and contour complementary with respect to the bead 12. The rim 34 has a pocket 35 extending through the entire perimeter the pocket 35 being open toward the bead 12 to permit application of the rim 34 of the facelet over the bead. Throughout some portions of the perimeter the rim 34 extends not over but also around the bead so that the facelet is fastened to the bead with relative security sufficient so that it cannot be easily knocked off when not in use.

It is important that the character of the material forming the facelet 30 be sufficiently pervious to the flow of

air or oxygen so that the resistance to flow when the mask is in place on the face is virtually negligible.

To make certain of a facelet of satisfactory structural characteristics the material may be formed of multiple layers 36, 37, and 38 for example of relatively long and somewhat resilient fibers of some appropriate synthetic plastic resinous material or other satisfactory natural fiber. By felting the individual layers of long and extremely fine fiber the fibers of respectively adjacent layers can be laid in a somewhat cross-wise relationship one with respect to the other and so that the outermost fibers of adjacent layers mingle with each other and interlock to a degree when the respective layers are pressed together to form a composite sheet. Forming the sheet material in this fashion helps provide a degree of stiffness sufficiently so that the mask facelet, once molded into a form adapted to fit inside of the face plate, will hold the form as long as needed. This is of assistance not only in being able to keep the facelet in position on the face piece when not in use but also keeps keep the central portion 31 distended away from the nose and mouth. The construction described is also productive of a sheet material so light and yielding that should the bowed area of the central portion 31 be pushed into contact with one or another of the parts of the valve assembly in the valve housing 26 or the parts of the microphone fixture 27 no damage will result to either.

Moreover by constructing the preformed facelet in the form and more particularly of the material suggested, the facelet can be constructed very inexpensively sufficient so that each facelet in turn can be disposed of after it has served one adjustment.

Normally the face piece will be provided with such a facelet in place and thereby ready for immediate use for adjusting to the face of the crewman. Should this not be feasible packages of appropriate facelets can be stored conveniently and applied over the bead of the mask when needed. Moreover the material of the facelet is such that it need not be precisely molded to fit each individual face piece. The rim 34 and pocket 35 of the facelet can be molded sufficiently around any one of a number of different types of beads 12 and, the central portion 31 maintained sufficiently clear of the face to accommodate many different types of nose structure and different locations of microphone and breathing valve apparatus within the face piece.

Having described the invention, what is claimed as new and in support of Letters Patent is:

1. In a mask face piece for application to the face of a wearer in a position covering the nose and mouth, a face fitting rim on the face piece and a relatively yieldable sealing bead on said rim for sealing engagement with the face when the mask is in position thereon, the combination of a filter facelet comprising a sheet filter medium comprising multiple layers of separately felted fibers pervious to the passage of air therethrough at negligible resistance, a rim on said facelet adapted to conform with the outline and contour of the sealing bead, said rim having a substantially continuous self-sustaining pocket hav-

ing a wall surrounding said sealing bead, said facelet having an opening on one side, said facelet having a self-sustaining mid portion extending toward the open side of said pocket to positions clear of the wearer's nose and mouth.

2. In a sanitary mask testing assembly comprising a formed face piece for application to the face of a wearer in position covering the nose and mouth, a face fitting rim on the face piece and a relatively yieldable sealing bead on said rim for sealing engagement with the face when the mask is in position thereon, breathing valve means at a forward portion thereof and a microphone fixture adjacent said valve means, the combination of a filter facelet comprising a sheet filter medium pervious to the passage of air therethrough at negligible resistance, a rim on said facelet in conformance with the outline and contour of said sealing bead, said rim having a substantially continuous pocket therein with an opening on one side mounting the facelet in position in the face piece, said facelet having a self-sustaining mid portion extending toward the open side of said pocket to positions clear of the wearer's nose and mouth and clear of the breathing valve and microphone.

3. In a sanitary mask testing assembly comprising a formed face piece for application to the face of a wearer in position covering the nose and mouth, a face fitting rim on the face piece and a relatively yieldable sealing bead on said rim for sealing engagement with the face when the mask is in position thereon, breathing valve means at a forward portion of the face piece and a microphone fixture adjacent said valve means, the combination of a filter facelet comprising a sheet filter medium having a thickness of from about $\frac{1}{64}$ to $\frac{3}{64}$ inch, said sheet comprising relatively long semi-resilient fibers in multiple layers of separately felted fibers wherein surface fibers on respectively adjacent faces of adjacent layers are intermingled and interlocked, said sheet being pervious to the passage of air therethrough at negligible resistance, a rim on said facelet in conformance with the outline and contour of said sealing bead, said rim having a substantially continuous pocket therein with an opening on one side and with a wall surrounding approximately half the exterior of the sealing bead whereby to retain the facelet having a self-sustaining mid portion extending toward the open side of said pocket to positions clear of the wearer's nose and mouth and clear of the breathing valve and microphone.

References Cited by the Examiner

UNITED STATES PATENTS

2,681,060	6/1954	Swindell	128—146
2,997,550	8/1961	Traller	128—141.1
3,169,171	2/1965	Wachs et al.	179—185
3,220,409	11/1965	Liloia et al.	128—146

RICHARD A. GAUDET, *Primary Examiner.*

K. L. HOWELL, *Assistant Examiner.*